THE

HICKOK

ELECTRICAL
INSTRUMENT
COMPANY

RETURN TO
AEROSPACE DIV.

HICKOK

CARDMATIC

Dynamic Mutual Conductance
Tube Tester
MODEL 123

CHOICE OF THE EXPERTS
FOR SPEED, ACCURACY
and DEPENDABILITY...

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OPERATING INSTRUCTIONS

MODEL 123

CARDMATIC TUBE TESTER

RETURN TO
AEROSPACE DIV.

THE HICKOK ELECTRICAL INSTRUMENT COMPANY
10514 Dupont Avenue Cleveland 8, Ohio

2490-307

STANDARD EIA GUARANTEE

The Hickok Electrical Instrument Company warrants instruments manufactured by it to be free from defective material or factory workmanship and agrees to repair such instruments which, under normal use and service, disclose the defect to be the fault of our manufacturing. Our obligation under this warranty is limited to repairing any instrument or test equipment which proves to be defective, when returned to us transportation prepaid, within 90 days from the date of original purchase, and provided the serial number has been made known to us promptly for our records.

This warranty does not apply to any of our products which have been repaired or altered by unauthorized persons or service stations in any way so as, in our judgment, to injure their stability or reliability, or which have been subject to misuse, negligence, or accident, or which have had the serial number altered, effaced or removed. Neither does this warranty apply to any of our products which have been connected, installed, or adjusted otherwise than in accordance with the instructions furnished by us. Accessories, including all vacuum tubes not of our manufacture, used with this product are not covered by this warranty.

This warranty is in lieu of all other warranties expressed or implied, and no representative or person is authorized to assume for us any other liability in connection with the sale of our products.

Parts will be made available for a minimum period of five years after the manufacture of this equipment has been discontinued. Parts include all materials, charts, instructions, diagrams, accessories, etc., which have been furnished in the standard model.

RETURNING EQUIPMENT FOR REPAIR

Before returning any equipment for service, under warranty or otherwise, the factory must first be contacted giving the nature of the trouble. Instructions will then be given for either correcting the trouble or returning the equipment. Upon authorization, this equipment should be forwarded directly to the Hickok factory address, 10636 Leuer Avenue, Cleveland, Ohio, or to a designated service station in your locality. All correspondence pertaining to repairs should be directed to the Hickok office address, 10514 Dupont Avenue, Cleveland 8, Ohio, or to the authorized service station designated.

REGISTRATION CARD

The above guarantee is contingent upon the attached registration card being returned to the factory immediately upon receipt of the equipment.

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THE HICKOK ELECTRICAL INSTRUMENT COMPANY
Cleveland, Ohio

DESCRIPTION:

The Model 123 is an automatic, "Card Type", tube tester which combines speed, simplicity of operating, and a high degree of accuracy.

It consists of the following items:

1 Automatic "Card Type" tube tester
1 Set Operating Cards
1 Instruction Book
1 Set Special Test Cards

The Model 123 is intended primarily for use in "Self Service" tube merchandising applications. All switching and connections are automatically set up by the new Hickok Card Switch System.

New circuitry, incorporated in the Model 123, evaluates tubes directly for (1) Leakage and Shorts, (2) Quality and (3) Gas. The results are indicated on a Good-Bad basis that leaves no doubt in the mind of the operator as to the condition of the tube.

Physically the Model 123 is housed in an attractive counter type case. Tube sockets, meter, short indicator, "On-Off", "Quality" and card switches are conviently arranged on the top panel. Complete operating instructions are also attached to the top panel.

Removable panels on the right side and back allow access to the calibrating controls and power supply tubes. Calibration, adjustment and routine maintenance can be accomplished without removing the tester from the counter case.

INSTALLATION:

The following procedure should be observed before operating the instrument to determine that it is functioning properly in all respects.

1. Visually inspect the instrument for damage during shipment. All claims for shipping damage should be made immediately with the carrier.

2. Remove the back panel from the counter type case. This is secured by eight Phillips head machine screws. (6-32 x 3/8)

3. Check that all tubes are securely held in their sockets. Refer to Figure #1.

   IMPORTANT: Be sure that the 100 watt light bulb is screwed tightly into the socket in the lower right hand corner. If this lamp is loose or missing, no filament voltages will be supplied to tubes being tested.

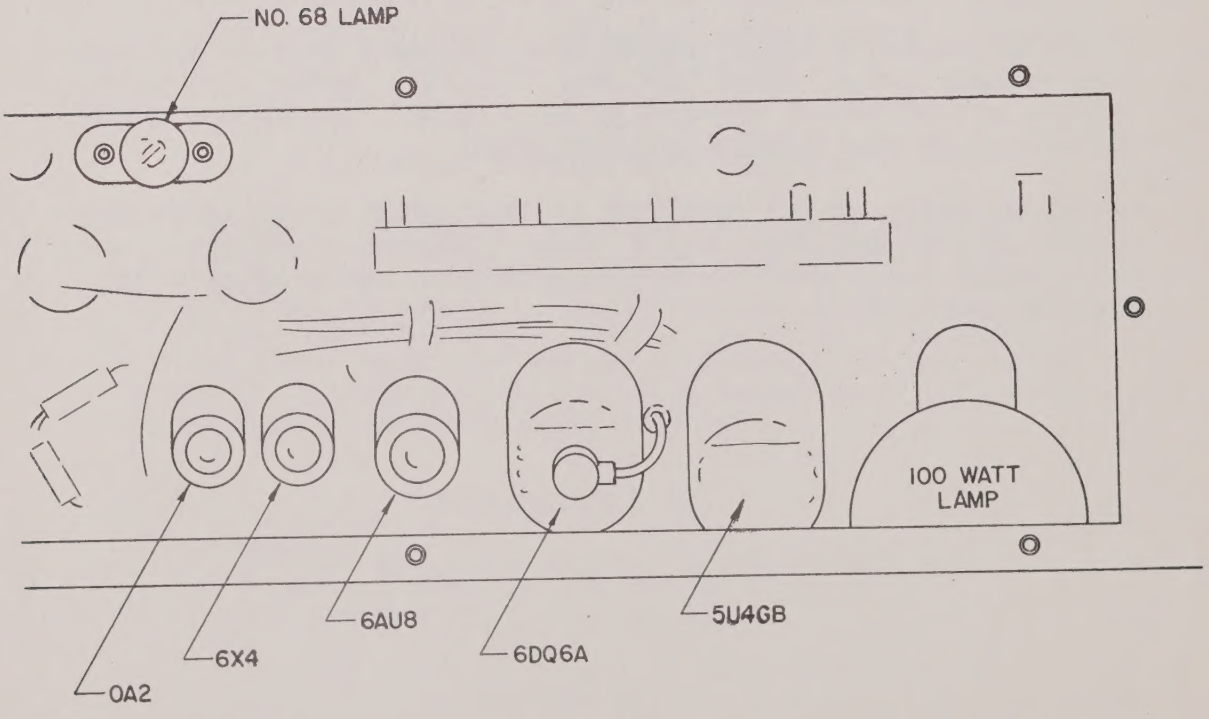


FIGURE 1
TUBE LOCATIONS AS SEEN WITH THE BACK PANAL REMOVED

INSTALLATION (cont.)

4. Connect the line cord to 115 volt 60 cycle AC source. Be sure to connect the green pig tail, built into the line plug, to a suitable electrical ground, such as grounded electrical box or water pipe. This connection grounds the panel and case and is required by Underwriters for electronic equipment of this type.

5. Turn tester on by depressing the red button in the upper right hand corner. Allow tester to warm up.

6. Using the special set of "test cards", check the operation and calibration as described under the Maintenance Section.

7. After checking the Model 123 with its test cards , the tester is ready for operation.

OPERATION:

Preliminary:

1. The Model 123 must be connected to a proper source of power as outlined under the Installation Section.

2. Depress the red "ON SWITCH" located in the upper right hand corner of the front panel. (Generally, the tube tester should be left on through-out the day, assuring instant operation when desired.) The instrument is now in a standby condition and prepared to perform testing operations as may be called for by the card system.

TUBE TESTING:

The green indicator lamp should be on before starting tube testing.

1. Select the card for the tube type to be tested.

2. Insert tube into socket indicated on card.

3. Insert card in slot of card switch - push card until switch engages and black knob comes up.

4. Allow 10 - 15 seconds warm-up for tube under test.

5. Observe short lamps under hood below meter. If any bulbs glow, tube is shorted, replace.

NOTE: Disregard any bulb glow that occurs after #2 button has been released.

		If Needle is in	
		RED	GREEN
6.	Observe needle position on meter scale 1	Replace	OK
7.	Push button 2 and read scale 2	Replace	OK
8.	Push button 3 and read scale 3	Replace	OK

9. GOLD printing on the card indicates one card is required to test the tube. RED printing denotes that two cards must be used for complete tests. GREEN printing denotes three and BLUE printing denotes four. Repeat test as above for each card.

MAINTENANCE:

A. The Model 123 is checked and calibrated at the factory prior to shipment. However, it should be checked with its own test cards during installation and at appropriate intervals thereafter to assure proper operation.

B. Test card checking and calibrating system:

1. Special test cards are furnished for use by maintenance men or other authorized personnel in checking the tester. These cards are contained in an envelope inside the back cover of this instruction book.

C. Test card check out procedure:

Turn tester on - allow 15 to 20 minutes warm up.

1. Insert card #1 in switch. Short lamps #1 and #5 should glow. Press #2 button. Meter should read half scale. If reading is other than half scale, adjust potentiometer #1. (See Figure #2) for proper reading.

2. Insert card #2. Short lamp #1 should glow. Press #2 button. Meter should read half scale. If other reading is obtained, adjust potentiometer #2.

3. Insert card #3, short lamp #1 should glow. Press #2 button. Adjust poetntiometer #3 to obtain half scale reading on meter.

4. Insert card #4 (150 V supply). Short lamp #1 should glow. Press #2 button and adjust potentiometer #4 to obtain half scale reading on the meter.

5. ADJUSTMENT #5 IS SET AND SEALED AT THE FACTORY. NO. 5 CARD IS NOT FURNISHED.

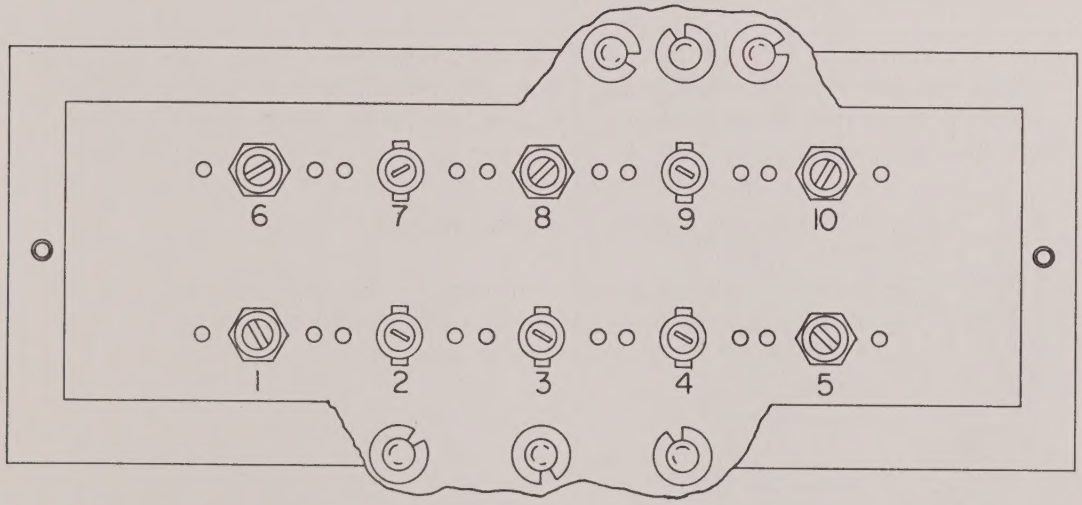


FIGURE 2

CALIBRATION CONTROLS AS SEEN WITH THE SIDE PANEL REMOVED.

6. Insert card #6. Press push button #2. The meter should indicate zero. If reading is off zero, adjust potentiometer #6 for correct indication.

7. Insert card #7. Press push button #2. The meter should indicate zero. Adjust potentiometer #7 for correct indication.

   REPEAT STEPS 6 and 7 TO ASSURE PROPER ADJUSTMENT

8. Adjustments #8, #9 and #10 are set and sealed at the factory.

If any of the above checks are not normal and cannot be adjusted properly follow the Trouble Shooting procedure. Should trouble still presist, contach the factory, giving the nature of the trouble. Instructions will then be given for either correcting the trouble or returning the equipment.

Address all service inquiries to the HICKOK ELECTRICAL INSTRUMENT COMPANY, 10514 DUPONT AVENUE, CLEVELAND 8, OHIO

TROUBLE SHOOTING

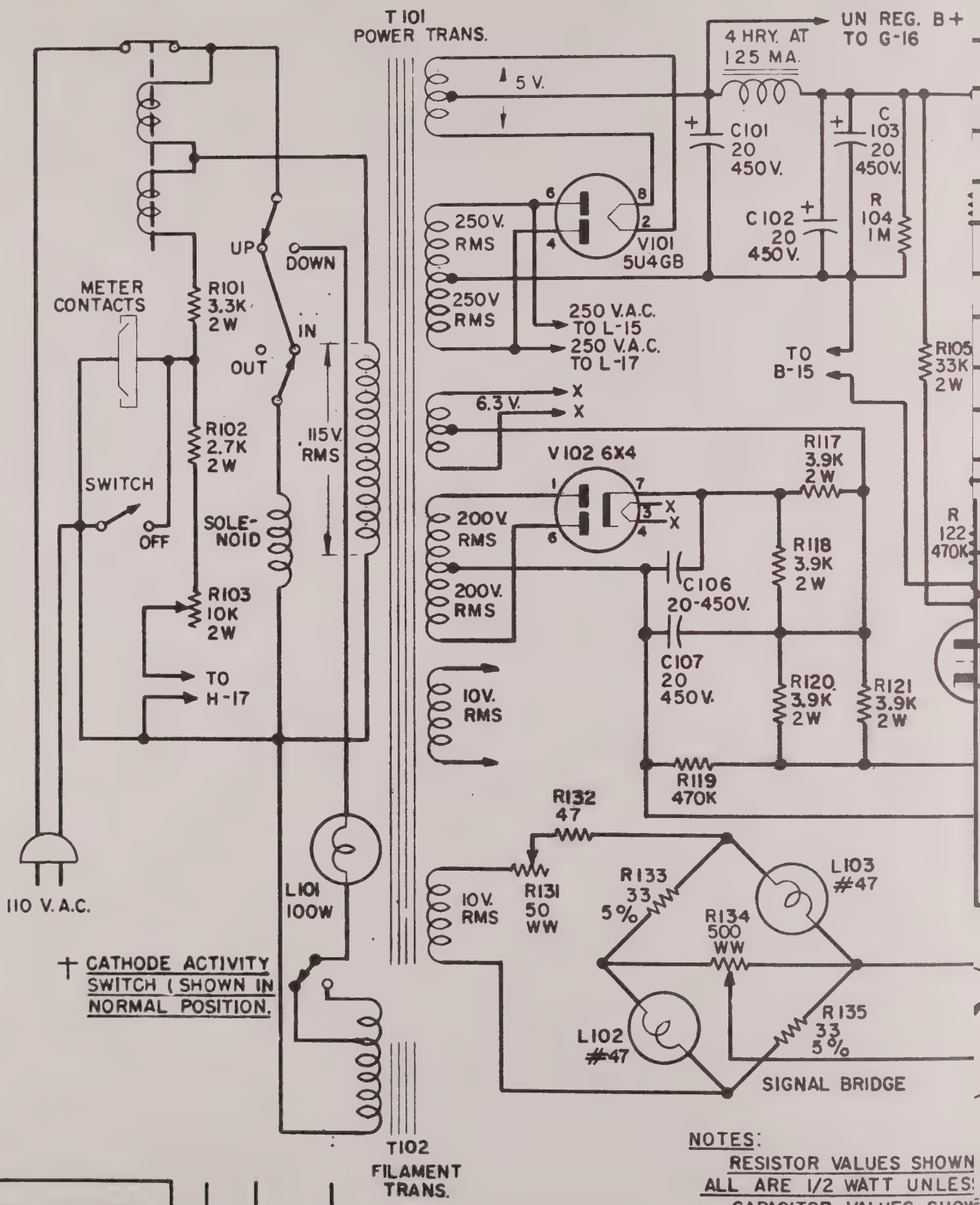
SYMPTOM	PROCEDURE
Test 1 will not adjust properly.	Replace 6X4 and OA2 Tubes
Test 2 or 3, or 4 can not be adjusted for mid-scale reading.	Replace 6DQ6A, 6AU8 and 5U4GB. Be sure the plate cap is connected to 6DQ6A and the cap lead is not touching either the body of the 6DQ6A or the 5U4GB.
Test 6 or 7 cannot be adjusted.	Replace #68 Auto Lamp
No filament voltage to tubes under test.	Tighten or replace the 100 watt light bulb
Card does not actuate the card switch when fully inserted.	First, check that the tester is turned on and card is being inserted properly, with printed side up. If trouble persists: TURN TESTER OFF! Move the card slowly back and forth in switch through last 1/4 inch of travel. A audible light "CLICK" of the micro switch should be heard. If NO "CLICK" is heard, readjust the micro switch as follows: Pull the line plug from the 115V A. C. power source. Remove the Phillips head screws on each side of the card switch cover. Lift the back of the cover, slide toward the front to clear the card guide and lift off. NOTE: The black reject knob must be down for cover to slide under the card guide.

SYMPTOM	PROCEDURE
Card does not actuate the card switch when fully inserted. (continued from previous page)	Loosen slightly the two screws which secure the micro switch to its bracket at the top of the card switch. Carefully position the micro switch until the card actuates it as indicated by the "CLICK". Tighten the mounting screws. Recheck the action with a card. Plug tester into power source and turn on. Check that card now properly actuates switch. CAUTION: LINE VOLTAGE IS PRESENT ACROSS THE MICRO SWITCH CONNECTIONS. Be sure that the card releases easily when the reject knob is pushed. If it does not, the micro switch has been set in too close. Readjust slightly as described above until proper operation is achieved. Replace card switch cover. Be sure to pull line plug when making these mechanical adjustments as noted above.

TROUBLE SHOOTING

SYMPTOM	PROCEDURE
Card will not come out of switch when rejected.	Actuate switch with card and push reject button again. If card still doesn't release, proceed as follows: Pull the line plug from the 115V A.C. power source. Remove the Phillips head screws on each side of the card switch cover. Lift the back of the cover, slide toward the front to clear the card guide and lift off. NOTE: The black reject knob must be down for cover to slide under the card guide. Inspect the tops of the contact pins as seen through the holes. One of these pins has moved up above its normal position through a hole in the card. Using a small screw driver, or other suitable tool, carefully push the pin down until it clears the card. The card should now slide easily out of the switch. Plug tester into power source and turn ON. Re-activate the switch several times with the same card. The card should be free to slide out each time the reject button is pushed. When operation is normal, replace card switch cover.

NOTES

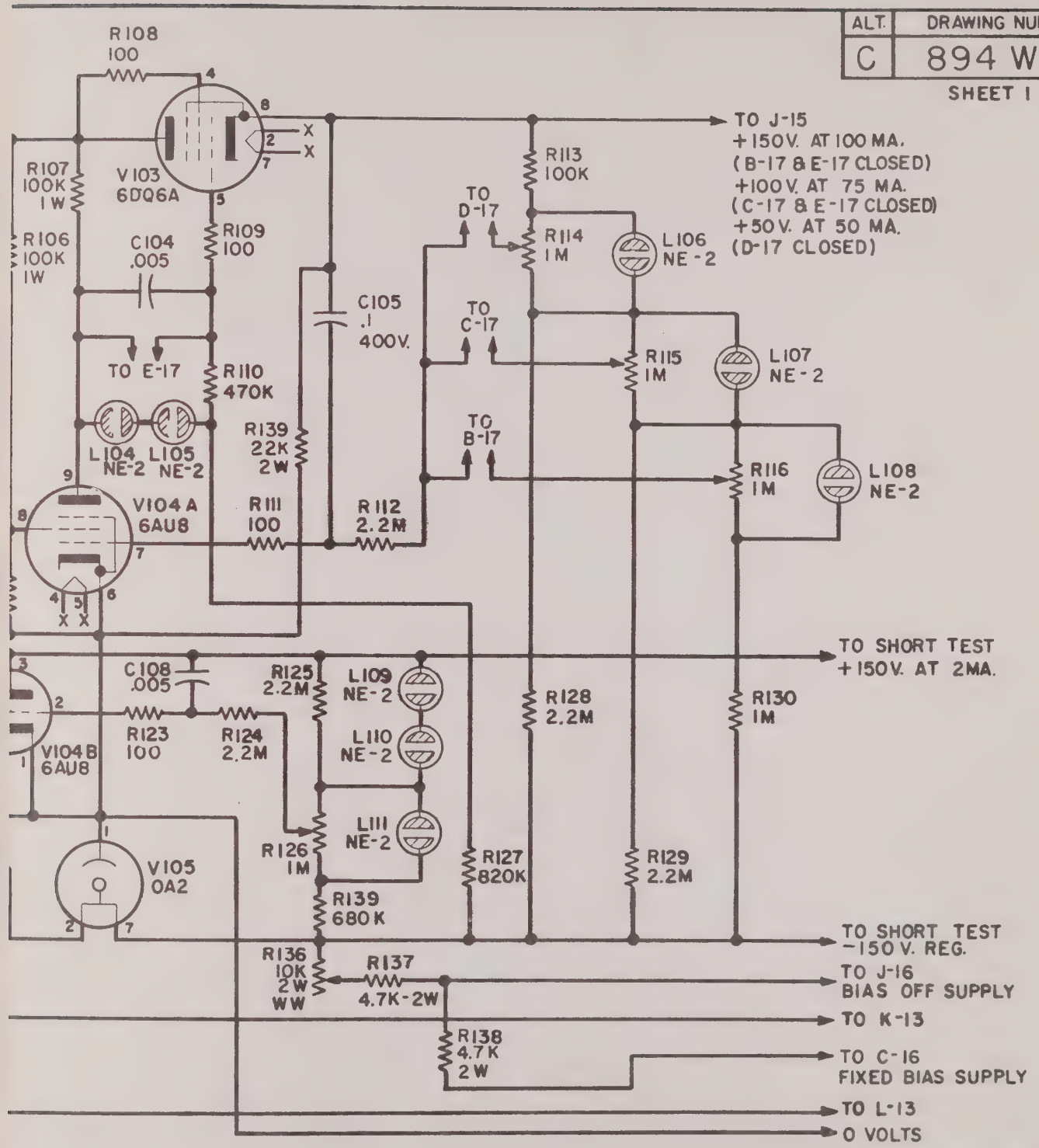


NOTES:
RESISTOR VALUES SHOWN
ALL ARE 1/2 WATT UNLES
CAPACITOR VALUES SHOW
† = USED ON 123 A ONLY.

NO	ALTERATION	BY	APP'D	DATE
C	18092 - 18131	RB		7-29-57
B	17738 - 17740	LD		4-2-57
A	17285	PK		11-29-56

ALT.	DRAWING NUMBER
C	894 W

SHEET 1 OF 4



IN OHMS – (M= MEGOHMS), K=1000 OHMS
S OTHERWISE NOTED
'N IN MICROFARADS.

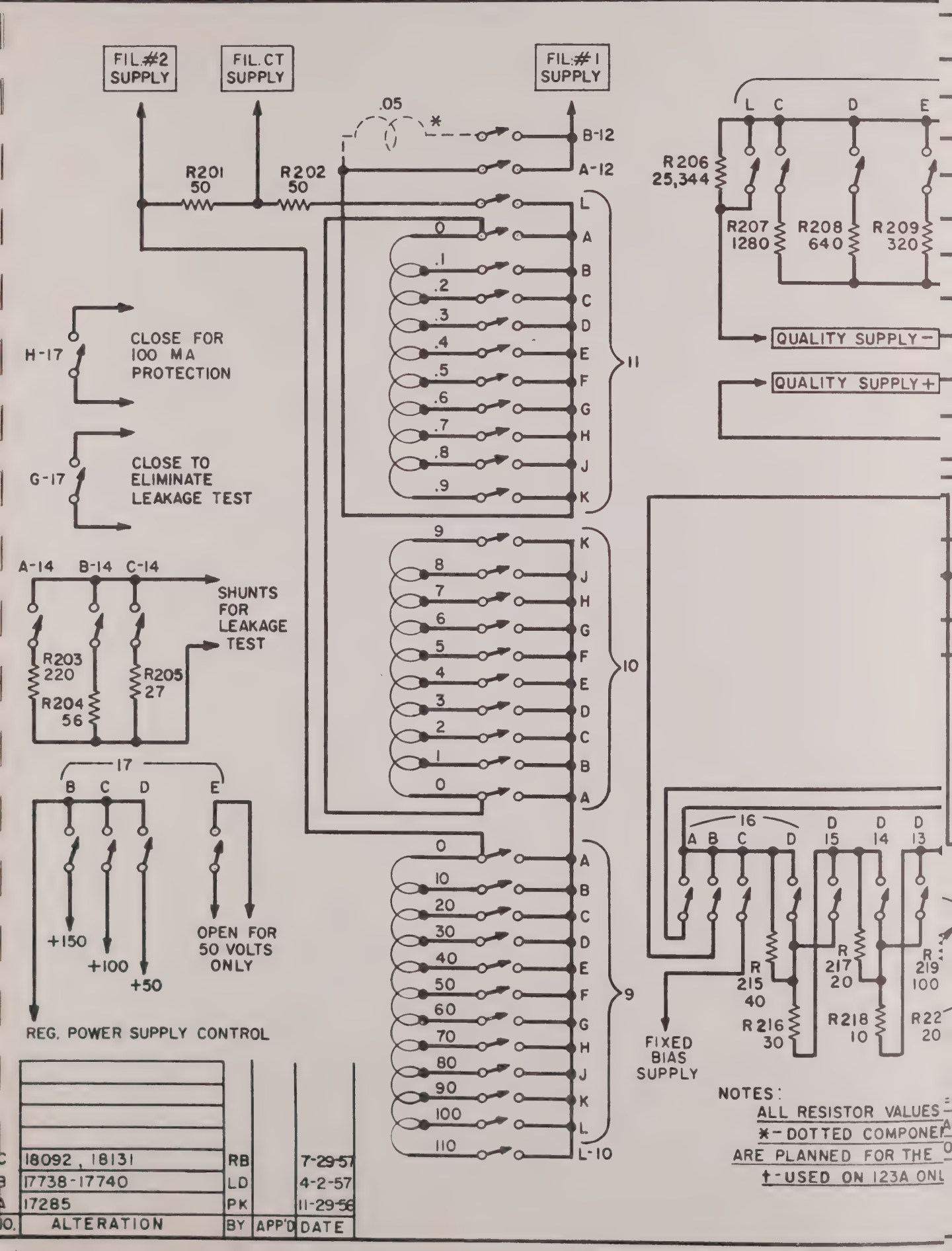
DRAWING NUMBER
894 W

TUBE TESTER - MODEL 123

SCHEMATIC - POWER SUPPLY

DRAWN & TRACED	CHECKED	APP'D.	DATE
LCH			8-14-56

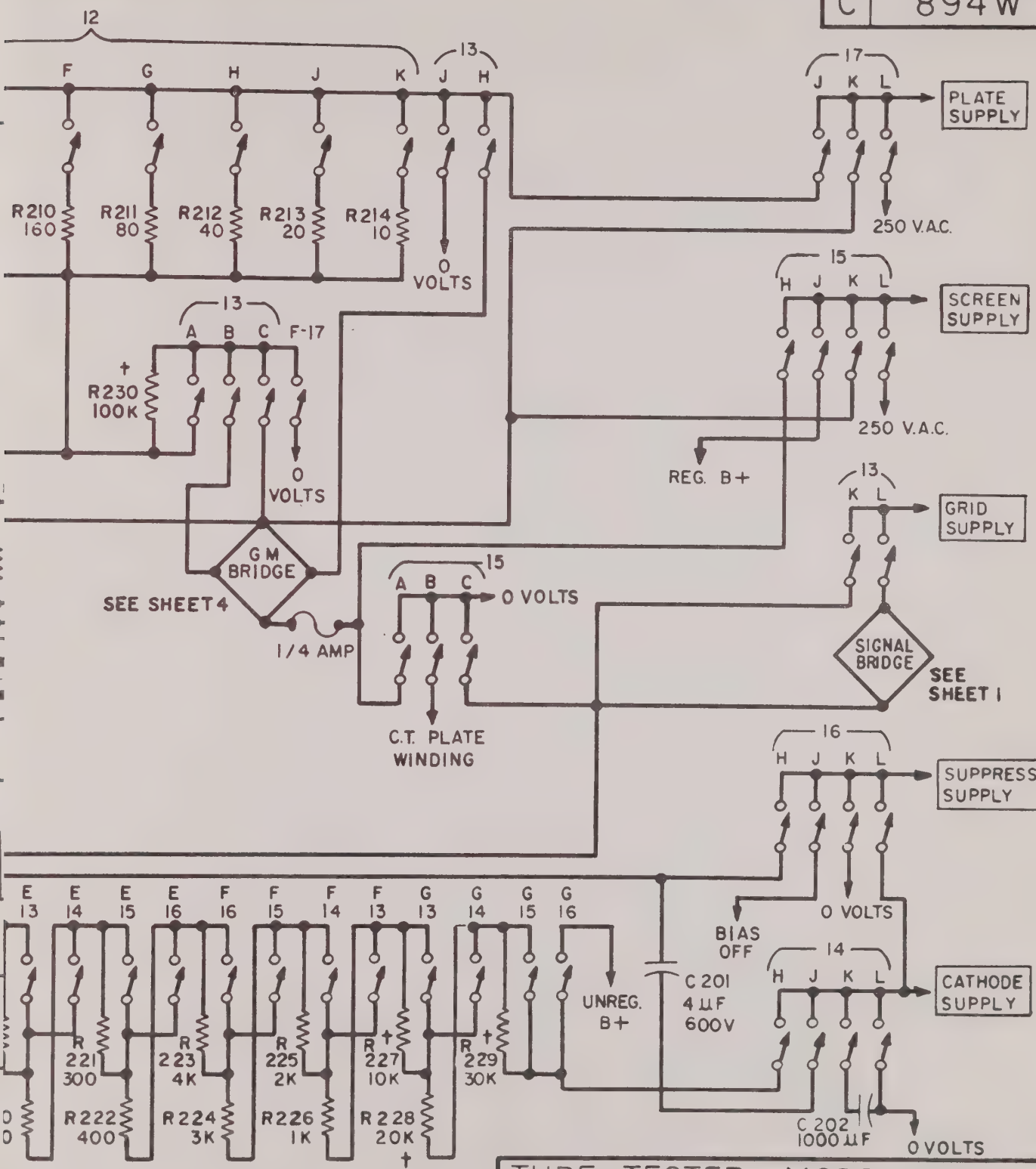
THE HICKOK ELECTRICAL INSTRUMENT CO.
CLEVELAND, OHIO



NOTES:
ALL RESISTOR VALUES
*-DOTTED COMPONE
ARE PLANNED FOR THE
†-USED ON 123A ONL

NO.	ALTERATION	BY	APP'D	DATE
C	18092, 18131	RB		7-29-57
B	17738-17740	LD		4-2-57
A	17285	PK		11-29-56

ALT.	DRAWING NUMBER
C	894W



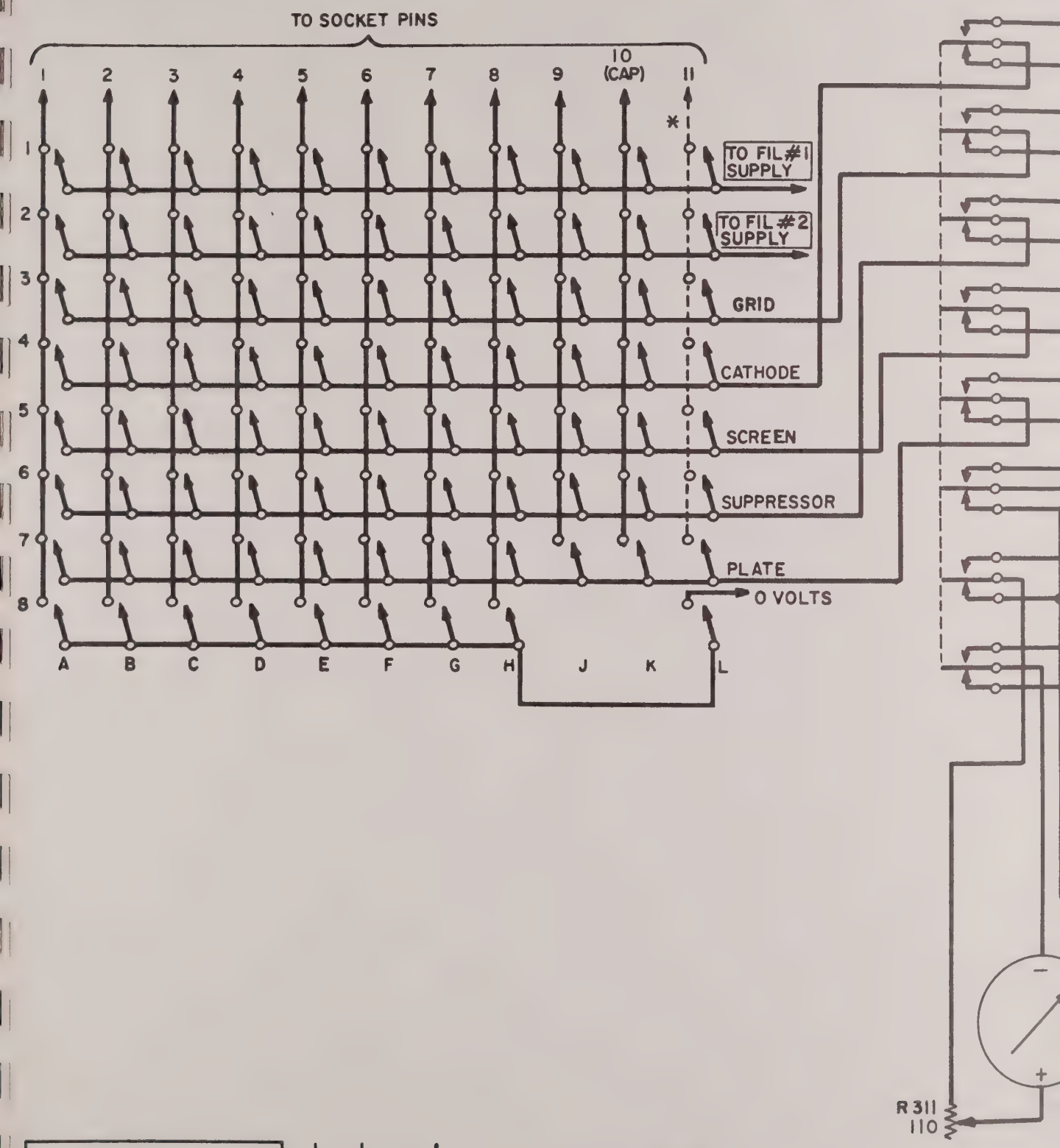
SHOWN IN OHMS, K=1000 OHMS
ITS, PRESENTLY SHORT CIRCUITS,
FUTURE
.Y.

TUBE TESTER - MODEL 123

SCHEMATIC-AUTOMATIC CIRCUIT SELECTION

DRAWN & TRACED	CHECKED	APP'D.	DRAWING NUMBER
LCH			894W

THE HICKOK ELECTRICAL INSTRUMENT CO.
CLEVELAND, OHIO
DATE: 8-20-56



NOTE:

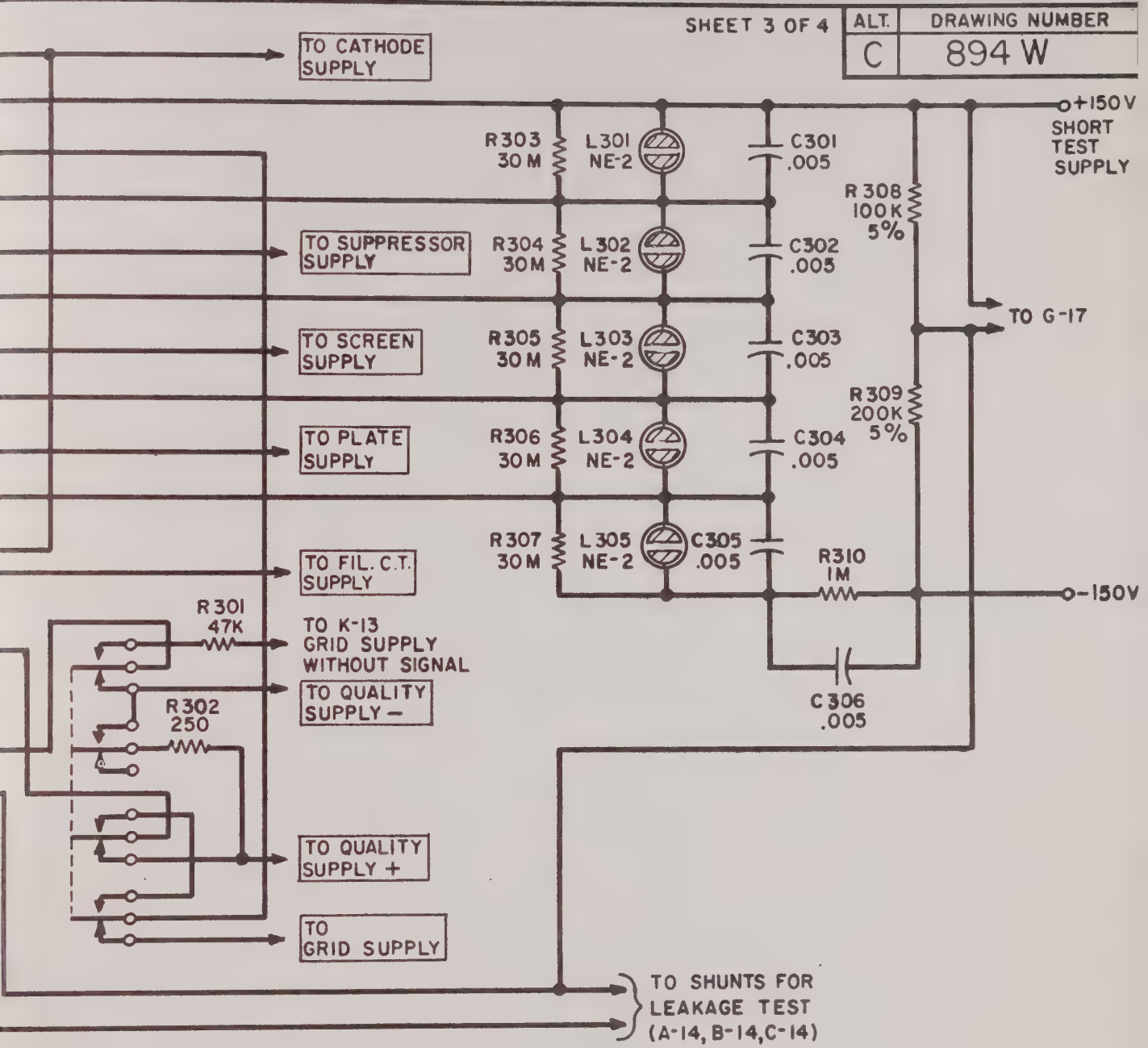
RESISTOR VALUES SHOWN IN OHMS - M

CAPACITOR VALUES SHOWN IN MICROFA

* - DOTTED LINE INDICATES FUTURE C

NO.	ALTERATION	BY	APP'D	DATE
C	18092 , 18131	RB		7-29-57
B	17738-17740	LD		4-2-57
A	17285	PK		11-29-57

ALT.	DRAWING NUMBER
C	894 W



M301
100 μA
210 Ω
± 20%

MEGOHMS - K=1000 OHMS.
RADS.
NNECTIONS.

DRAWING NUMBER
894 W

TUBE TESTER - MODEL 123

SCHEMATIC-AUTOMATIC PIN SELECTION

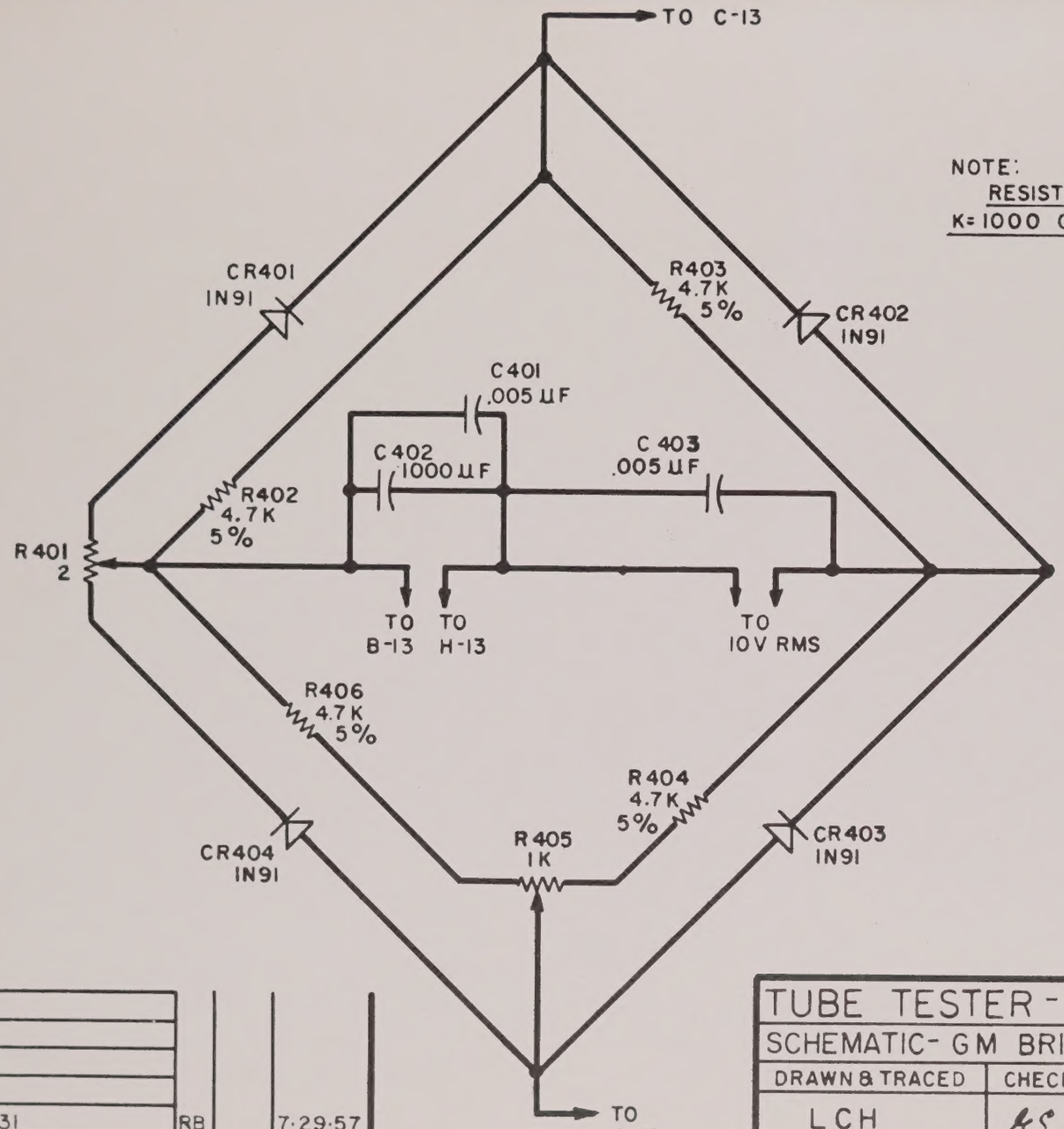
DRAWN & TRACED	CHECKED	APP'D	DATE
LCH	G.E.		8-31-56

THE HICKOK ELECTRICAL INSTRUMENT CO.
CLEVELAND, OHIO

ALT.	DRAWING NUMBER
C	894 W

SHEET 4 OF 4

NOTE:
RESISTOR VALUES SHOWN IN OHMS,
K= 1000 OHMS.



NO.	ALTERATION	BY	APP'D	DATE
C	18092 - 18131	RB		7-29-57
B	17738-17740	LD		4-2-57
A	17285	PK		11-29-57

DRAWING NUMBER
894 W

TUBE TESTER - MODEL 123

SCHEMATIC - GM BRIDGE

DRAWN & TRACED	CHECKED	APP'D.	DATE
LCH	SES	EBW	9-4-56

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CLEVELAND, OHIO

HICKOK
H
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COMPANY
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